



SEQUENCE LISTING

<110> MYCOTA BIOSCIENCES INC.
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<120> IDENTIFICATION OF CANDIDA ALBICANS ESSENTIAL FUNGAL
SPECIFIC GENES AND USE THEREOF IN ANTIFUNGAL DRUG
DISCOVERY

<130> 10182-015-999 (originally 12875.3)

<140> 10/018,105 (national stage of PCT/CA00/00533)

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<150> 60/132,878

<151> 1999-05-05

<160> 13

<170> FastSEQ for Windows Version 4.0

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<213> Candida albicans

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Met	Ser	Phe	Ala	Arg	Tyr	Ile	Tyr	Tyr	Thr	Ile	Ala	Val	Ala	Val	Leu	
1				5					10						15	
Leu	Asn	Phe	Val	Lys	Ala	Thr	Glu	Asn	Asn	Asn	Phe	Lys	Leu	Glu	Val	
			20					25					30			
Glu	Ala	Ser	Trp	Ser	Asn	Ile	Asp	Phe	Leu	Pro	Ser	Phe	Ile	Glu	Ala	
		35					40					45				
Ile	Val	Gly	Phe	Asn	Asp	Ser	Leu	Tyr	Glu	Gln	Thr	Ile	Glu	Thr	Ile	
	50					55					60					
Phe	Gly	Leu	Gly	Asp	Thr	Glu	Val	Glu	Leu	Glu	Asp	Asp	Ala	Ser	Asp	
65					70					75					80	
Gln	Glu	Ile	Tyr	Ser	Thr	Val	Ile	Asn	Ser	Leu	Gly	Leu	Thr	Asp	Gln	
				85					90					95		
Asp	Leu	Asp	Phe	Ile	Asn	Phe	Asp	Leu	Thr	Asn	Lys	Lys	His	Thr	Pro	
			100					105					110			
Arg	Ile	Ala	Ala	His	Tyr	Asp	His	Tyr	Ser	Asp	Val	Leu	Thr	Lys	Phe	
	115						120					125				
Gly	Asp	Arg	Leu	Lys	Ser	Glu	Cys	Ala	Lys	Asp	Ser	Phe	Gly	Asn	Ala	
	130					135					140					
Val	Glu	Thr	Lys	Asn	Gly	Gln	Ile	Gln	Thr	Trp	Leu	Leu	Tyr	Asn	Asp	
145					150					155					160	
Lys	Ile	Tyr	Cys	Ser	Ala	Asn	Asp	Leu	Phe	Ala	Leu	Arg	Thr	Asp	Leu	
				165					170					175		
Ser	Ser	His	Ser	Thr	Leu	Leu	Phe	Asp	Arg	Ile	Ile	Gly	Lys	Ser	Lys	
			180					185					190			
Asp	Ala	Pro	Leu	Val	Ile	Leu	Tyr	Gly	Ser	Pro	Thr	Glu	Glu	Leu	Thr	
		195					200					205				
Lys	Asp	Phe	Leu	Lys	Ile	Leu	Tyr	Pro	Asp	Ala	Lys	Ala	Gly	Lys	Leu	
	210					215					220					
Lys	Phe	Val	Trp	Arg	Tyr	Ile	Pro	Leu	Gly	Ile	Lys	Lys	Leu	Asp	Ser	
225					230					235					240	
Ile	Ser	Gly	Tyr	Gly	Val	Ser	Leu	Lys	Met	Glu	Lys	Tyr	Asp	Tyr	Ser	
				245					250					255		
Gly	Ala	Glu	Gly	Asn	Pro	Lys	Tyr	Asp	Leu	Ser	Arg	Asp	Phe	Thr	Arg	
			260					265					270			
Ile	Asn	Asp	Ser	Gln	Glu	Leu	Val	Leu	Val	Asn	Glu	Lys	His	Ser	Tyr	
		275					280					285				

Glu	Leu	Gly	Val	Lys	Leu	Thr	Ser	Phe	Ile	Leu	Ser	Asn	Arg	Tyr	Lys	290	295	300
Ser	Thr	Lys	Tyr	Asp	Leu	Leu	Asp	Thr	Ile	Leu	Thr	Asn	Phe	Pro	Lys	305	310	315
Phe	Ile	Pro	Tyr	Ile	Ala	Arg	Leu	Pro	Lys	Leu	Leu	Asn	His	Glu	Lys	325	330	335
Val	Lys	Ser	Lys	Val	Leu	Gly	Asn	Glu	Asp	Ile	Gly	Leu	Ser	Gln	Asp	340	345	350
Ser	Tyr	Gly	Ile	Tyr	Ile	Asn	Gly	Ser	Pro	Ile	Asn	Pro	Leu	Glu	Leu	355	360	365
Asp	Ile	Tyr	Asn	Leu	Gly	Thr	Arg	Ile	Lys	Glu	Glu	Leu	Gln	Thr	Val	370	375	380
Lys	Asp	Leu	Val	Lys	Leu	Gly	Phe	Asp	Thr	Val	Gln	Ala	Lys	Leu	Leu	385	390	395
Ile	Ala	Lys	Phe	Ala	Leu	Leu	Ser	Ala	Val	Lys	Gln	Thr	Gln	Phe	Arg	405	410	415
Asn	Gly	Asn	Thr	Leu	Met	Gly	Asn	Asn	Glu	Asn	Arg	Phe	Lys	Val	Tyr	420	425	430
Glu	Asn	Glu	Phe	Lys	Lys	Gly	Ser	Ser	Glu	Lys	Gly	Gly	Val	Leu	Phe	435	440	445
Phe	Asn	Asn	Ile	Glu	Leu	Asp	Asn	Thr	Phe	Lys	Glu	Tyr	Thr	Thr	Asp	450	455	460
Arg	Glu	Glu	Ala	Tyr	Leu	Gly	Val	Gly	Ser	His	Lys	Leu	Lys	Pro	Asn	465	470	475
Gln	Ile	Pro	Leu	Leu	Lys	Glu	Asn	Ile	His	Asp	Leu	Ile	Phe	Ala	Leu	485	490	495
Asn	Phe	Gly	Asn	Lys	Asn	Gln	Leu	Arg	Val	Phe	Phe	Thr	Leu	Ser	Lys	500	505	510
Val	Ile	Leu	Asp	Ser	Gly	Ile	Pro	Gln	Gln	Val	Gly	Val	Leu	Pro	Val	515	520	525
Ile	Gly	Asp	Asp	Pro	Met	Asp	Leu	Leu	Leu	Ala	Glu	Lys	Phe	Tyr	Trp	530	535	540
Ile	Ala	Glu	Lys	Ser	Ser	Thr	Gln	Glu	Ala	Leu	Ala	Ile	Leu	Tyr	Lys	545	550	555
Tyr	Phe	Glu	Ser	Asn	Ser	Pro	Asp	Glu	Val	Asp	Asp	Leu	Leu	Asp	Lys	565	570	575
Val	Glu	Val	Pro	Glu	Asp	Tyr	Lys	Val	Asp	Tyr	Asn	His	Val	Leu	Asn	580	585	590

Lys Phe Ser Ile Ser Thr Ala Ser Val Ile Phe Asn Gly Val Ile Tyr
 595 600 605
 Asp Leu Arg Ala Pro Asn Trp Gln Ile Ala Met Ser Lys Gln Ile Ser
 610 615 620
 Gln Asp Ile Ser Leu Ile Lys Thr Phe Leu Arg Gln Gly Pro Ile Glu
 625 630 635 640
 Gly Arg Leu Lys Asp Val Leu Tyr Ser Asn Ala Lys Ser Glu Arg Asn
 645 650 655
 Leu Arg Ile Ile Pro Leu Glu Pro Ser Asp Ile Ile Tyr Lys Lys Ile
 660 665 670
 Asp Lys Glu Leu Ile Asn Asn Ser Ile Ala Phe Lys Lys Leu Asp Lys
 675 680 685
 Ala Gln Gly Val Ser Gly Thr Phe Trp Leu Val Ser Asp Phe Thr Lys
 690 695 700
 Ser Ala Ile Ile Thr Gln Leu Ile Asp Leu Leu Leu Leu Lys Lys
 705 710 715 720
 Lys Ala Ile Gln Ile Arg Ile Ile Asn Thr Gly Asp Thr Asp Val Phe
 725 730 735
 Gly Lys Leu Lys Thr Lys Phe Lys Leu Thr Ala Leu Thr Asn Gly Gln
 740 745 750
 Ile Asp Glu Ile Ile Glu Ile Leu Lys Lys Ser Asn Ala Ser Ser Ala
 755 760 765
 Asn Asn Asp Glu Leu Lys Lys Met Leu Glu Thr Lys Gln Leu Pro Ala
 770 775 780
 His His Ser Phe Leu Leu Phe Asn Ser Arg Tyr Phe Arg Leu Asp Gly
 785 790 795 800
 Asn Phe Gly Tyr Glu Glu Leu Asp Gln Ile Ile Glu Phe Glu Val Ser
 805 810 815
 Gln Arg Leu Asn Leu Ile Pro Asp Ile Met Glu Ala Tyr Pro Asp Glu
 820 825 830
 Phe Arg Ser Lys Lys Val Ser Asp Phe Asn Leu Val Leu Ser Gly Leu
 835 840 845
 Asp Asn Met Asp Trp Phe Asp Leu Val Thr Ser Ile Val Thr Lys Ser
 850 855 860
 Phe His Val Asp Glu Lys Arg Phe Ile Val Asp Val Asn Arg Phe Asp
 865 870 875 880
 Phe Ser Ser Leu Asp Phe Ser Asn Ser Ile Asp Val Thr Thr Tyr Glu
 885 890 895

Glu	Asn	Ser	Pro	Val	Asp	Val	Leu	Ile	Ile	Leu	Asn	Pro	Met	Asp	Glu	900	905	910	
Tyr	Ser	Gln	Lys	Leu	Ile	Ser	Leu	Val	Asn	Ser	Ile	Thr	Asp	Phe	Leu	915	920	925	
Phe	Leu	Asn	Ile	Arg	Ile	Leu	Leu	Gln	Pro	Arg	Val	Asp	Leu	Lys	Glu	930	935	940	
Glu	Ile	Lys	Ile	His	Lys	Phe	Tyr	Arg	Gly	Val	Tyr	Pro	Gln	Pro	Thr	945	950	955	960
Pro	Lys	Phe	Asp	Ser	Asn	Gly	Lys	Trp	Ile	Gln	His	Tyr	Ser	Ala	Gln	965	970	975	
Phe	Glu	Ser	Ile	Pro	Ser	Asn	Val	Thr	Tyr	Ser	Thr	Glu	Leu	Asp	Val	980	985	990	
Pro	His	Lys	Trp	Ile	Val	Val	Pro	Gln	Leu	Ser	Ser	Met	Asp	Leu	Asn	995	1000	1005	
Thr	Ile	Asn	Phe	Ser	Glu	Ser	His	Ser	Val	Asp	Ala	Lys	Tyr	Ser	Leu	1010	1015	1020	
Lys	Asn	Ile	Leu	Ile	Glu	Gly	Tyr	Ala	Arg	Asp	Ile	His	Thr	Gly	Lys	1025	1030	1035	1040
Ala	Pro	Asp	Gly	Leu	Ile	Phe	Arg	Ala	Phe	Asn	Lys	Asn	Tyr	Ser	Thr	1045	1050	1055	
Asp	Thr	Leu	Val	Met	Thr	Ser	Leu	Asp	Tyr	Phe	Gln	Ile	Lys	Ala	Tyr	1060	1065	1070	
Pro	Ser	Ile	Phe	Asn	Phe	Ser	Thr	Thr	Ser	Asn	Asp	Thr	Leu	Leu	Ser	1075	1080	1085	
Ala	Ser	Glu	Asn	Lys	Tyr	Gln	Ala	Asn	Thr	Glu	Glu	Leu	Glu	Ser	Ile	1090	1095	1100	
Glu	Val	Pro	Val	Phe	Lys	Ile	Asp	Gly	Ser	Thr	Ile	Tyr	Pro	Arg	Val	1105	1110	1115	1120
Met	Lys	Ser	Gly	Asn	Asn	Lys	Pro	Met	Leu	Thr	Arg	Lys	His	Ala	Asp	1125	1130	1135	
Ile	Asn	Ile	Phe	Thr	Ile	Ala	Ser	Gly	Gln	Leu	Tyr	Glu	Lys	Leu	Thr	1140	1145	1150	
Ser	Ile	Met	Ile	Ala	Ser	Val	Arg	Lys	His	Asn	Pro	Ser	Leu	Thr	Ile	1155	1160	1165	
Lys	Phe	Trp	Ile	Leu	Glu	Asp	Phe	Val	Thr	Pro	Gln	Phe	Lys	His	Leu	1170	1175	1180	
Val	Glu	Leu	Ile	Ser	Ile	Lys	Tyr	Asn	Val	Glu	Tyr	Glu	Phe	Ile	Ser	1185	1190	1195	1200

Tyr Lys Trp Pro Asn Phe Leu Arg Lys Gln Lys Thr Lys Glu Arg Met
 1205 1210 1215
 Ile Trp Gly Tyr Lys Ile Leu Phe Leu Asp Val Leu Phe Pro Gln Asp
 1220 1225 1230
 Leu Asn Lys Ile Ile Phe Ile Asp Ala Asp Gln Ile Cys Arg Ala Asp
 1235 1240 1245
 Leu Thr Glu Leu Val Asn Met Asp Leu Glu Gly Ala Pro Tyr Gly Phe
 1250 1255 1260
 Thr Pro Met Cys Asp Ser Arg Glu Glu Met Glu Gly Phe Arg Phe Trp
 1265 1270 1275 1280
 Lys Glu Gly Tyr Trp Ser Asp Val Leu Lys Asp Asp Leu Lys Tyr His
 1285 1290 1295
 Ile Ser Ala Leu Phe Val Val Asp Leu Gln Lys Phe Arg Ser Ile Lys
 1300 1305 1310
 Ala Gly Asp Arg Leu Arg Ala His Tyr Gln Lys Leu Ser Ser Asp Pro
 1315 1320 1325
 Asn Ser Leu Ser Asn Leu Asp Gln Asp Leu Pro Asn Asn Met Gln Arg
 1330 1335 1340
 Leu Ile Lys Ile Phe Ser Leu Pro Gln Asn Trp Leu Trp Cys Glu Thr
 1345 1350 1355 1360
 Trp Cys Ser Asp Lys Ser Leu Glu Asp Ala Lys Met Ile Asp Leu Cys
 1365 1370 1375
 Asn Asn Pro Leu Thr Arg Glu Asn Lys Leu Asp Ala Ala Lys Arg Leu
 1380 1385 1390
 Ile Pro Glu Trp Ile Glu Tyr Glu Gln Glu Ile Glu Pro Leu Val Ser
 1395 1400 1405
 Leu Val Gln Asn Asn Thr Ala Lys Glu Val Val Gln Glu Ile Glu Ile
 1410 1415 1420
 Asp Thr Asp Gly Glu Gln Glu Glu Gln Lys Gln Glu Ser Asn Asp Asp
 1425 1430 1435 1440
 Asp Phe Ile His Asp Glu Leu
 1445

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 <213> Candida albicans

<220>
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<221> Misc feature

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aattaaacag tcactagtcc tcagtcctca gtccttagtt cttggttctt aatattaaga 180

ataatattta ccagaaattg ctacaaatat aaataaataa ataaataaat ataattaaga 300

tat	tat	caa	aat	tca	act	act	aat	caa	cct	att	cct	aga	tct	gat	gaa	403
Tyr	Tyr	Gln	Asn	Ser	Thr	Thr	Asn	Gln	Pro	Ile	Pro	Arg	Ser	Asp	Glu	
			10					15					20			

gta ttg gat gat cat aga aat caa atc act aat gat tgt gcc att agt 451
Val Leu Asp Asp His Arg Asn Gln Ile Thr Asn Asp Cys Ala Ile Ser
25 30 35

gat agt gaa gat gag ttg gaa tta aaa tca gaa tta gaa tca gaa gtt 499
Asp Ser Glu Asp Glu Leu Glu Leu Lys Ser Glu Leu Glu Ser Glu Val
40 45 50

gta aaa agc gaa aaa caa caa caa cat cat caa gag att aca tca gat 547
Val Lys Ser Glu Lys Gln Gln Gln His His Gln Glu Ile Thr Ser Asp
55 60 65 70

aat gct aaa cca ttg act cgt aaa tct ggt tct tca att aag aaa aaa 595
Asn Ala Lys Pro Leu Thr Arg Lys Ser Gly Ser Ser Ile Lys Lys Lys
75 80 85

tct aat ctt acc gat aaa gat aga att acc aac cct atg agt tta tct 643
Ser Asn Leu Thr Asp Lys Asp Arg Ile Thr Asn Pro Met Ser Leu Ser
90 95 100

ggt ggt gat gat act att aac agc ggt cac aaa aat cgt aat tat aac 691
Gly Gly Asp Asp Thr Ile Asn Ser Gly His Lys Asn Arg Asn Tyr Asn
105 110 115

atg agt tca tta cgt aaa gat ttt tat tta aaa gat aat act gac gac 739
Met Ser Ser Leu Arg Lys Asp Phe Tyr Leu Lys Asp Asn Thr Asp Asp
120 125 130

aat tct act aat aat cat act cat ctt gca att cca att cca att cca 787
Asn Ser Thr Asn Asn His Thr His Leu Ala Ile Pro Ile Pro Ile Pro

135	140	145	150	
att cca acc cca att att act aat gct aat aaa tca aga aga aaa tct				835
Ile Pro Thr Pro Ile Ile Thr Asn Ala Asn Lys Ser Arg Arg Lys Ser	155	160	165	
caa ttg gaa aat tta cct cca tta att aaa aag aaa aca att ggt cgt				883
Gln Leu Glu Asn Leu Pro Pro Leu Ile Lys Lys Lys Thr Ile Gly Arg	170	175	180	
aat aat tct aat aat ttt gaa aat gat tta gtt agt ccc atg aca aaa				931
Asn Asn Ser Asn Asn Phe Glu Asn Asp Leu Val Ser Pro Met Thr Lys	185	190	195	
atg aaa act aat gat agt gaa gat att act aat act agc acc act gct				979
Met Lys Thr Asn Asp Ser Glu Asp Ile Thr Asn Thr Ser Thr Thr Ala	200	205	210	
aat cat atg aaa ctt ggt att ggt gct aca acc ctt ggt gtt gga act				1027
Asn His Met Lys Leu Gly Ile Gly Ala Thr Thr Leu Gly Val Gly Thr	215	220	225	230
ggt act acc gcc act gcc act gcc act gct gct gct ggt aga aga cca				1075
Gly Thr Thr Ala Thr Ala Thr Ala Thr Ala Ala Ala Gly Arg Arg Pro	235	240	245	
tct cgt tca tct att gat agt gaa gct gat tct cat gca tca aga tca				1123
Ser Arg Ser Ser Ile Asp Ser Glu Ala Asp Ser His Ala Ser Arg Ser	250	255	260	
tct caa gaa act gaa gaa gat gtt tgt ttt cct atg gtt ggt gat cat				1171
Ser Gln Glu Thr Glu Glu Asp Val Cys Phe Pro Met Val Gly Asp His	265	270	275	
att aga gtt aat gga att gat ttt gat gaa att gat gaa ttt att aga				1219
Ile Arg Val Asn Gly Ile Asp Phe Asp Glu Ile Asp Glu Phe Ile Arg	280	285	290	
gaa gaa aga gaa gaa gct tat tta caa aaa caa atg att gct aaa aat				1267
Glu Glu Arg Glu Glu Ala Tyr Leu Gln Lys Gln Met Ile Ala Lys Asn	295	300	305	310
att ctg cgt att gat gaa ttt caa aat ctt tcc aaa aat aat act act				1315
Ile Leu Arg Ile Asp Glu Phe Gln Asn Leu Ser Lys Asn Asn Thr Thr	315	320	325	
agt ggt gca tct cgt cat cca tat cat cat cac agt aat aat aat aaa				1363
Ser Gly Ala Ser Arg His Pro Tyr His His His Ser Asn Asn Asn Lys	330	335	340	
aaa aat aat ggt ggt gat ggt ggt ggt tct agt atg gca gca tta aaa				1411
Lys Asn Asn Gly Gly Asp Gly Gly Gly Ser Ser Met Ala Ala Leu Lys	345	350	355	
tat act cca aaa aat att tta aag aaa aca tta tca aga ttt gaa ttt				1459
Tyr Thr Pro Lys Asn Ile Leu Lys Lys Thr Leu Ser Arg Phe Glu Phe				

360	365	370	
act cat gaa aat tct tca tct tca gaa gaa att tat gaa ttg aag act			1507
Thr His Glu Asn Ser Ser Ser Ser Glu Glu Ile Tyr Glu Leu Lys Thr			
375	380	385	390
aaa caa caa cca cct tac aaa tat gat gat caa tta tca tta act tca			1555
Lys Gln Gln Pro Pro Tyr Lys Tyr Asp Asp Gln Leu Ser Leu Thr Ser			
	395	400	405
tct aca tct tct act tct gga tct gga tct ggg cag gtg aaa ttt ggt			1603
Ser Thr Ser Ser Thr Ser Gly Ser Gly Ser Gly Gln Val Lys Phe Gly			
	410	415	420
gga gca aga att tct gat ggg att aat gga ggt tca tta cct gat aga			1651
Gly Ala Arg Ile Ser Asp Gly Ile Asn Gly Gly Ser Leu Pro Asp Arg			
	425	430	435
ttt tca ctt ttc cat tct gaa tca gaa gaa act att cat gcc ccc gat			1699
Phe Ser Leu Phe His Ser Glu Ser Glu Glu Thr Ile His Ala Pro Asp			
	440	445	450
att cca tca tta gta tca cca ggt caa tct gtt cga gat tta ttt aga			1747
Ile Pro Ser Leu Val Ser Pro Gly Gln Ser Val Arg Asp Leu Phe Arg			
455	460	465	470
aat ggt gaa gaa act tgg tgg tta gat tgt act tgt cct act gat tcg			1795
Asn Gly Glu Glu Thr Trp Trp Leu Asp Cys Thr Cys Pro Thr Asp Ser			
	475	480	485
gaa atg aaa atg ttg gcc aaa gca ttt ggt att cat cct tta act gct			1843
Glu Met Lys Met Leu Ala Lys Ala Phe Gly Ile His Pro Leu Thr Ala			
	490	495	500
gaa gat att cga atg caa gaa act cgt gaa aaa gtt gaa tta ttt aaa			1891
Glu Asp Ile Arg Met Gln Glu Thr Arg Glu Lys Val Glu Leu Phe Lys			
	505	510	515
agt tat tat ttt gtt tgt ttc cat act ttt gaa gct gat aaa gaa tct			1939
Ser Tyr Tyr Phe Val Cys Phe His Thr Phe Glu Ala Asp Lys Glu Ser			
	520	525	530
gaa gat tat tta gaa ccg ata aat gtt tat att gtt gtt ttc cat gat			1987
Glu Asp Tyr Leu Glu Pro Ile Asn Val Tyr Ile Val Val Phe His Asp			
535	540	545	550
ggg ata tta acg ttc cat ttt tca cca att tct cat cca gca aat gtt			2035
Gly Ile Leu Thr Phe His Phe Ser Pro Ile Ser His Pro Ala Asn Val			
	555	560	565
aga aga aga gtt cgt caa ttg aga gat tat gtc gat gtt agt gct gat			2083
Arg Arg Arg Val Arg Gln Leu Arg Asp Tyr Val Asp Val Ser Ala Asp			
	570	575	580
tgg tta tgt tat gcc tta atc gat gaa att acc gat ggt ttt gcc ccc			2131
Trp Leu Cys Tyr Ala Leu Ile Asp Glu Ile Thr Asp Gly Phe Ala Pro			

585	590	595	
gtg att cat gga att gaa tat gaa gct gat gcc att gaa gat gcc gtt Val Ile His Gly Ile Glu Tyr Glu Ala Asp Ala Ile Glu Asp Ala Val 600 605 610			2179
ttc act gct aga gat act gat ttt agt agt atg tta caa aga att ggt Phe Thr Ala Arg Asp Thr Asp Phe Ser Ser Met Leu Gln Arg Ile Gly 615 620 625 630			2227
gaa tca aga aga aaa gtc atg act tta atg aga tta tta tca ggt aaa Glu Ser Arg Arg Lys Val Met Thr Leu Met Arg Leu Leu Ser Gly Lys 635 640 645			2275
gct gat gtc att aaa atg ttt gct aaa aga tgt caa gaa gaa gct aat Ala Asp Val Ile Lys Met Phe Ala Lys Arg Cys Gln Glu Glu Ala Asn 650 655 660			2323
tct tct tct ggt tat tat caa cgt caa tat aac tta caa caa caa caa Ser Ser Ser Gly Tyr Tyr Gln Arg Gln Tyr Asn Leu Gln Gln Gln Gln 665 670 675			2371
caa cag gcc cca cca cca cca cct aat cct att att act tca cca att Gln Gln Ala Pro Pro Pro Pro Pro Asn Pro Ile Ile Thr Ser Pro Ile 680 685 690			2419
aat tca act ttg aat ctt aat agt tta gga act tca act ggt gga gga Asn Ser Thr Leu Asn Leu Asn Ser Leu Gly Thr Ser Thr Gly Gly Gly 695 700 705 710			2467
gta gga gta gga gga att aat ttt ggt ccc aat cca act gga aat aat Val Gly Val Gly Gly Ile Asn Phe Gly Pro Asn Pro Thr Gly Asn Asn 715 720 725			2515
act aat act aat act aat act act ggt tca cct tca cca cct caa caa Thr Asn Thr Asn Thr Asn Thr Thr Gly Ser Pro Ser Pro Pro Gln Gln 730 735 740			2563
caa caa caa cat ggt atc act aac aaa tct ttc ccc atc ccc gat gca Gln Gln Gln His Gly Ile Thr Asn Lys Ser Phe Pro Ile Pro Asp Ala 745 750 755			2611
cgt cca aga gct gat att gca tta tat tta ggt gat att caa gat cat Arg Pro Arg Ala Asp Ile Ala Leu Tyr Leu Gly Asp Ile Gln Asp His 760 765 770			2659
ata atc acc atg ttt caa aat tta tta gcc tat gaa aaa att ttc agt Ile Ile Thr Met Phe Gln Asn Leu Leu Ala Tyr Glu Lys Ile Phe Ser 775 780 785 790			2707
cgt tca cat tca aat tat tta gct caa tta caa gtt gaa tca ttc aat Arg Ser His Ser Asn Tyr Leu Ala Gln Leu Gln Val Glu Ser Phe Asn 795 800 805			2755
tcc aat aat aaa atc acc gaa atg ttt tct aaa att act ttg att ggg Ser Asn Asn Lys Ile Thr Glu Met Phe Ser Lys Ile Thr Leu Ile Gly 810 815 820			2803

aca atg tta gtt cca tta aat tta gtc acg gga ctt ttt ggt atg aat	2851
Thr Met Leu Val Pro Leu Asn Leu Val Thr Gly Leu Phe Gly Met Asn	
825 830 835	
gta aga gtc cct ggt gaa ggt ggt acc aat tta ggt tgg ttt ttc gga	2899
Val Arg Val Pro Gly Glu Gly Gly Thr Asn Leu Gly Trp Phe Phe Gly	
840 845 850	
att gtt gga gta tta ata ttt ata att att gga tca ttt ata ttt gct	2947
Ile Val Gly Val Leu Ile Phe Ile Ile Ile Gly Ser Phe Ile Phe Ala	
855 860 865 870	
caa tgg tgg ttg aaa aaa ttg aat aat tca att gaa gga caa aat aat	2995
Gln Trp Trp Leu Lys Lys Leu Asn Asn Ser Ile Glu Gly Gln Asn Asn	
875 880 885	
ggt aat cga cca att ttt aat cat tca tca aga aga tca att aga agt	3043
Gly Asn Arg Pro Ile Phe Asn His Ser Ser Arg Arg Ser Ile Arg Ser	
890 895 900	
tta ggt tta aaa aaa cat ggt ggt aat aaa tca att att agt ttc ccc	3091
Leu Gly Leu Lys Lys His Gly Gly Asn Lys Ser Ile Ile Ser Phe Pro	
905 910 915	
aat aaa tat gaa taagaataat caaagaaatg ccacagagtt tgatggtttg	3143
Asn Lys Tyr Glu	
920	
tttttttttt ttttattgtc atgatggagt tgtatataca tatacttttt atagaagtaa	3203
caatagtaaa tgataatagt agtcatcaat catcatattt ataattgtat ataatcgtat	3263
actaacttct tcttgattta gggaaagagt tatattattt actataaaca tttattttta	3323
cgagtttgtt taaattggag agtcaaatta ataggatgta aaagaagttt ttaaagaagg	3383
aataaagaaa tattataatt cagangttca tacagaaggg gggggaagga gaaggggata	3443
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tatcaattat tatcaatatt gc	3525
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Glu Asn Met Phe Thr Ile Ser Asn Val Phe Ser Asp Asn Ala Gln Asp 225 230 235 240		
Leu Ile Lys Ile Ile Asp Val Ile Asn Lys Leu Leu Ala Glu Tyr Ser 245 250 255		
Asp Ala Ser Asp Leu Gly Gly Gly Asp Glu Asp Val Asn Met Asp Val 260 265 270		
Gln Ile Thr Asp Glu Arg Ser Lys Val Phe Arg Glu Ile Ile Glu Thr 275 280 285		
Glu Arg Lys Tyr Val Gln Asp Leu Glu Leu Met Cys Lys Tyr Arg Gln 290 295 300		
Asp Leu Ile Glu Ala Glu Asn Leu Ser Ser Glu Gln Ile His Leu Leu 305 310 315 320		
Phe Pro Asn Leu Asn Glu Ile Ile Asp Phe Gln Arg Arg Phe Leu Asn 325 330 335		
Gly Leu Glu Cys Asn Ile Asn Val Pro Ile Arg Tyr Gln Arg Ile Gly 340 345 350		
Ser Val Phe Ile His Ala Ser Leu Gly Pro Phe Asn Ala Tyr Glu Pro		

355		360		365
Trp Thr Ile Gly Gln Leu	Thr Ala Ile Asp Leu	Ile Asn Lys Glu Ala		
370	375	380		
Ala Asn Leu Lys Lys Ser	Ser Ser Leu Leu Asp	Pro Gly Phe Glu Leu		
385	390	395	400	
Gln Ser Tyr Ile Leu Lys	Pro Ile Gln Arg Leu	Cys Lys Tyr Pro Leu		
405	410	415		
Leu Leu Lys Glu Leu Ile	Lys Thr Ser Pro Glu	Tyr Ser Lys Gln Asp		
420	425	430		
Pro His Gly Ser Ser Ser	Leu Thr Ser Phe Asn	Glu Leu Leu Val Ala		
435	440	445		
Lys Thr Ala Met Lys Glu	Leu Ala Asn Gln Val	Asn Glu Ala Gln Arg		
450	455	460		
Arg Ala Glu Asn Ile Glu	His Leu Glu Lys Leu	Lys Glu Arg Val Gly		
465	470	475	480	
Asn Trp Arg Gly Phe Asn	Leu Asp Ala Gln Gly	Glu Leu Leu Phe His		
485	490	495		
Gly Gln Val Gly Val Lys	Asp Ala Glu Asn Glu	Lys Glu Tyr Val Ala		
500	505	510		
Tyr Leu Phe Glu Lys Ile	Val Phe Phe Thr Glu	Ile Asp Asp Asn		
515	520	525		
Lys Lys Ser Asp Lys Gln	Glu Lys Lys Ser Lys	Phe Ser Thr Arg Lys		
530	535	540		
Arg Ser Thr Ser Ser Asn	Leu Ser Ser Ser Thr	Thr Asn Leu Leu Glu		
545	550	555	560	
Ser Ile Asn Asn Ser Arg	Lys Asp Asn Thr Leu	Pro Leu Glu Leu Lys		
565	570	575		
Gly Arg Val Tyr Ile Ser	Glu Ile Tyr Asn Ile	Ser Ala Pro Asn Thr		
580	585	590		
Pro Gly Ser Thr Leu Ile	Ile Ser Trp Ser Gly	Arg Lys Glu Ser Gly		
595	600	605		
Ser Phe Thr Leu Arg Tyr	Arg Ser Glu Glu Ala	Arg Asn Gln Trp Glu		
610	615	620		
Lys Cys Leu Arg Asp Leu	Lys Thr Asn Glu Met	Asn Lys Gln Ile His		
625	630	635	640	
Lys Lys Leu Arg Asp Ser	Asp Leu Ser Phe Asn	Thr Asp Asp Ser Ala		
645	650	655		
Ile Tyr Asp Tyr Thr Gly	Ile Ser Thr Ser Pro	Val Asn Gln Ser Thr		

660	665	670
Gln Gln Gln Tyr Tyr Asp His Arg Gly Ser His Ser Ser Arg His His		
675	680	685
Ser Ser Ser Ser Thr Leu Ser Met Met Lys Asn Asn Arg Val Lys Ser		
690	695	700
Gly Asp Leu Ser Arg Ile Ser Ser Thr Ser Thr Thr Leu Asp Ser Phe		
705	710	715
Ser Asn Asn Leu Asn Gly Ser Pro Asn Thr Thr Asn Pro Ser Leu Thr		
725	730	735
Ser Ser Asp Ala Thr Lys Thr Ile Pro Thr Phe Asp Val Ala Ile Lys		
740	745	750
Leu Leu Tyr Lys Ser Thr Glu Leu Ser Glu Pro Leu Ile Val Asn Ala		
755	760	765
Gln Ile Glu Tyr Asn Asp Leu Leu Gln Lys Ile Ile Ser Gln Ile Ile		
770	775	780
Thr Ser Asn Leu Val Ala Asp Asp Val Asn Ile Ser Arg Leu Arg Tyr		
785	790	795
Lys Asp Asp Glu Gly Asp Phe Val Asn Leu Asn Ser Asp Asp Asp Trp		
805	810	815
Gly Leu Val Leu Asp Met Leu Thr Ser Glu Asp Phe Tyr Gln Thr Ser		
820	825	830
Ser Asn Glu Lys Arg Leu Val Thr Val Trp Val Ser		
835	840	

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Trp Ser Ile Leu Val His Leu Leu Gly Asp Val Asp Asn Gln Leu Leu
35 40 45
Thr Asn Leu Tyr Pro Leu Val Thr Gly Leu Asp Asp Glu Ile Asp Ile
50 55 60
Gln Glu Asn Leu Val Ala Leu Thr Ser Asn Val Leu Arg Glu Arg Tyr
65 70 75 80
Asp Lys Glu Asp Val Ala Asp Leu Leu Glu Leu Tyr Ala Ser Leu Tyr
85 90 95

Lys	His	Ser	Lys	His	Ile	Pro	Val	Pro	Asp	Val	Phe	His	Leu	Leu	Asp	545	550	555	560
Glu	Leu	Gln	Ile	Asp	Glu	Thr	Ser	Ile	Ile	Ile	Asn	Gly	Glu	Ile	Tyr	565	570		575
Pro	Phe	Arg	Lys	Asn	Trp	Asn	Tyr	Leu	Ile	Ala	Lys	Val	Ile	Lys	Lys	580	585		590
Asp	Thr	Glu	Phe	Ile	Arg	Lys	Glu	Leu	Ser	Asn	Ser	Ser	Pro	Lys	Asn	595	600		605
Lys	Gln	Ile	Ser	Val	Arg	Asp	Leu	Leu	His	Tyr	Lys	Ser	Ala	Asn	Leu	610	615		620
Arg	His	Asn	Lys	Tyr	Thr	Pro	Asn	Tyr	Phe	Ala	Asp	Ser	Val	Tyr	Ser	625	630		635
Ser	Val	Asn	Asn	Thr	Ala	Leu	Glu	Ser	Val	Cys	Ser	Glu	Arg	Ile	Gly	645	650		655
Tyr	Tyr	Thr	Lys	Asn	Glu	Glu	Tyr	Asn	Leu	Leu	His	Thr	Ile	Thr	Leu	660	665		670
Val	Asp	Asp	Phe	Gly	Ser	Ile	His	Ala	Leu	Lys	Arg	Leu	Arg	Asn	Leu	675	680		685
Leu	His	Thr	Ser	Phe	Val	Gly	Val	Arg	Ile	Arg	Ile	Ile	His	Val	Gly	690	695		700
Asp	Ile	Ser	Asp	Ile	Trp	Tyr	Gln	Leu	Arg	Gly	Ser	Leu	Ser	Gln	Lys	705	710		715
Asp	Pro	Ile	Gly	Ser	Ile	Asn	Thr	Phe	Ile	Asp	Ala	Leu	Lys	Leu	Lys	725	730		735
Lys	Val	Lys	Ser	His	Thr	Tyr	Lys	Lys	Ser	Gly	Leu	Asn	Gln	Leu	Gly	740	745		750
Leu	His	Lys	Trp	Leu	Pro	Asp	Ile	Pro	Leu	Phe	Glu	Leu	Gln	Lys	Gly	755	760		765
Ser	Phe	Ile	Ala	Leu	Asn	Gly	Arg	Phe	Ile	Ile	Leu	Ile	Lys	Met	Lys	770	775		780
Cys	Gln	Lys	Gln	Asn	Ile	Ser	Lys	Ala	Lys	Ile	Lys	Arg	Glu	Ala		785	790		795
Leu	Arg	Thr	Ile	Asp	Ser	Val	Phe	Ala	Leu	Asp	Leu	Leu	Phe	Pro	Gly	805	810		815
Phe	Ser	Gln	Glu	Ile	Ile	Asn	Pro	Asp	Leu	Ile	Glu	Met	Ile	Ser	Ser	820	825		830
Ile	Leu	Thr	Arg	Leu	Phe	Tyr	Gln	Gly	Thr	His	Ile	Tyr	Asn	Asn	Gly	835	840		845
Ile	Asp	Tyr	Thr	Thr	Glu	Ser	Ser	Leu	Pro	Arg	Met	Asp	Leu	Ser	Glu	850	855		860
Phe	Phe	Arg	Pro	Asn	Asn	Leu	Thr	Met	Phe	Glu	Asp	Gly	Lys	Ser	Ala	865	870		875
Ser	Ile	Asp	Leu	Leu	Leu	Ile	Leu	Asp	Pro	Leu	Glu	Glu	Arg	Thr	Gln	885	890		895
Met	Ile	Leu	Ser	Leu	Val	Glu	Gln	Phe	Arg	Pro	Leu	Lys	Phe	Val	Asn	900	905		910
Ile	Gln	Val	Ile	Leu	Met	Pro	Thr	Leu	Glu	Leu	Asn	Ile	Val	Pro	Ile	915	920		925
Arg	Arg	Ile	Tyr	Val	Asp	Asp	Ala	Asp	Ile	Val	Lys	Ser	Ile	Thr	Ser	930	935		940
Glu	Lys	Ser	Arg	Ser	Asp	Pro	Glu	Val	Asp	Ile	Glu	Met	Asp	Val	Pro	945	950		955
Asn	Ser	Phe	Ile	Val	Asp	Asn	Asn	Tyr	Arg	Ile	Lys	Lys	Leu	Leu	Ile	965	970		975
Glu	Leu	His	Ser	Phe	Ser	Ser	Lys	Thr	Val	Leu	Ser	Thr	Gly	Asn	Ile	980	985		990
Asp	Gly	Met	Gly	Gly	Val	Cys	Leu	Ala	Leu	Val	Asp	Ser	Ala	Gly	Asn				

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Tyr	Thr	Pro	Thr	Ser	Gly	Glu	Ser	Ser	Gln	Ser	Tyr	Pro	Ile	Thr	Thr
			20					25					30		
Leu	Ile	Asn	Ala	Lys	Trp	Thr	Gln	Thr	Pro	Leu	Tyr	Leu	Glu	Ile	Ala
		35					40					45			
Glu	Tyr	Leu	Ala	Asp	Glu	Gln	Ala	Gly	Leu	Phe	Trp	Asp	Tyr	Val	Ser
	50					55				60					
Gly	Val	Thr	Lys	Leu	Asp	Thr	Val	Leu	Asn	Glu	Tyr	Asp	Thr	Glu	Ser
65					70				75					80	
Gln	Gln	Tyr	Asn	Ala	Ala	Leu	Glu	Leu	Val	Lys	Ser	His	Val	Ser	Ser
			85						90					95	
Pro	Gln	Leu	Pro	Leu	Leu	Arg	Leu	Val	Ser	Met	His	Ser	Ser	Leu	Thr
			100					105					110		
Pro	Arg	Ile	Gln	Thr	His	Phe	Gln	Leu	Ala	Glu	Glu	Leu	Arg	Ser	Ser
		115					120					125			
Gly	Ser	Cys	Gln	Ser	Phe	Thr	Phe	Ala	Gln	Val	Gly	Ser	Glu	Leu	Ala
	130					135					140				
Cys	Ser	Phe	Asn	Glu	Leu	Gln	Lys	Lys	Leu	Glu	Val	Pro	Leu	Ala	Lys
145					150					155				160	
Asp	Ser	Leu	Asp	Ala	Pro	Val	Val	Thr	Tyr	Ser	Phe	Asp	His	Ile	Phe
			165						170					175	
Pro	Gly	Ser	Glu	Asn	Asn	Thr	Arg	Thr	Val	Val	Leu	Tyr	Gly	Asp	Leu
			180					185					190		
Gly	Ser	Ser	Gln	Phe	Arg	Thr	Tyr	His	Lys	Leu	Leu	Glu	Lys	Glu	Ala
		195					200					205			
Asn	Ala	Gly	Arg	Ile	Arg	Tyr	Ile	Leu	Arg	His	Gln	Leu	Ala	Lys	Lys
	210					215					220				
Asp	Lys	Arg	Pro	Val	Arg	Leu	Ser	Gly	Tyr	Gly	Val	Glu	Leu	His	Leu
225					230					235				240	
Lys	Ser	Thr	Glu	Tyr	Lys	Ser	Gln	Asp	Asp	Ala	Pro	Lys	Pro	Glu	Ala
			245						250					255	
Gly	Ser	Thr	Ser	Asp	Glu	Asp	Leu	Ala	Asn	Glu	Ser	Asp	Val	Gln	Gly
			260					265					270		
Phe	Asp	Phe	Lys	Val	Leu	Lys	Gln	Lys	His	Pro	Thr	Leu	Lys	Arg	Ala
	275						280					285			
Leu	Asp	Gln	Leu	Arg	Gln	Arg	Leu	Leu	Gln	Gly	Asn	Asp	Glu	Ile	Ala
	290					295					300				
Gln	Leu	Lys	Ala	Trp	Glu	Phe	Gln	Asp	Leu	Gly	Leu	Gln	Ala	Ala	Ala
305					310					315				320	
Ala	Ile	Ala	Glu	Ile	Gln	Gly	Asp	Glu	Thr	Leu	Gln	Ile	Leu	Gln	Tyr
			325						330					335	
Thr	Ala	His	Asn	Phe	Pro	Met	Leu	Ala	Arg	Thr	Leu	Leu	Ala	His	Lys
			340					345					350		
Val	Thr	Asp	Gly	Leu	Arg	Ala	Glu	Val	Lys	His	Asn	Thr	Glu	Ala	Phe
		355					360					365			
Gly	Arg	Ser	Leu	Asn	Val	Ala	Pro	Pro	Asp	Gly	Ala	Leu	Phe	Ile	Asn
	370					375					380				
Gly	Leu	Phe	Phe	Asp	Ala	Asp	Thr	Met	Asp	Leu	Tyr	Ser	Leu	Ile	Glu
385					390					395				400	
Thr	Leu	Arg	Ser	Glu	Met	Arg	Val	Leu	Glu	Ser	Leu	His	Ser	Asn	Asn
				405					410					415	
Val	Arg	Gly	Ser	Leu	Ala	Ser	Ser	Leu	Leu	Ala	Leu	Asp	Leu	Thr	Ala
			420					425					430		
Ser	Ser	Lys	Lys	Glu	Phe	Ala	Ile	Asp	Ile	Arg	Asp	Thr	Ala	Val	Gln
		435					440					445			

Trp	Val	Asn	Asp	Ile	Glu	Asn	Asp	Val	Gln	Tyr	Arg	Arg	Trp	Pro	Ser	450	455	460
Ser	Val	Met	Asp	Leu	Leu	Arg	Pro	Thr	Phe	Pro	Gly	Met	Leu	Arg	Asn	465	470	475
Ile	Arg	Lys	Asn	Val	Phe	Asn	Leu	Val	Leu	Val	Val	Asp	Ala	Leu	Gln	485	490	495
Pro	Thr	Ala	Arg	Ser	Val	Ile	Lys	Leu	Ser	Glu	Ser	Phe	Val	Ile	His	500	505	510
Gln	Ala	Pro	Ile	Arg	Leu	Gly	Leu	Val	Phe	Asp	Ala	Arg	Asp	Ala	Asn	515	520	525
Glu	Asp	Asn	Leu	Ala	Asp	Tyr	Val	Ala	Ile	Thr	Cys	Ala	Tyr	Asn	Tyr	530	535	540
Val	Ser	Gln	Lys	Lys	Asp	Ala	Arg	Ala	Ala	Leu	Ser	Phe	Leu	Thr	Asp	545	550	555
Ile	Tyr	Ala	Ala	Val	Gly	Glu	Thr	Lys	Val	Val	Thr	Lys	Lys	Asp	Ile	565	570	575
Val	Lys	Gln	Leu	Thr	Lys	Glu	Phe	Thr	Ser	Leu	Ser	Phe	Ala	Lys	Ala	580	585	590
Glu	Glu	Phe	Leu	Glu	Glu	Asp	Ser	Thr	Tyr	Asp	Tyr	Gly	Arg	Glu	Leu	595	600	605
Ala	Ala	Glu	Phe	Ile	Gln	Arg	Leu	Gly	Phe	Gly	Asp	Lys	Glu	Gln	Pro	610	615	620
Gln	Ala	Leu	Leu	Asn	Gly	Val	Pro	Met	Pro	Ser	Asn	Val	Val	Thr	Ala	625	630	635
Asp	Ser	Asp	Phe	Glu	Glu	Ala	Ile	Phe	Thr	Glu	Ile	Met	Thr	His	Thr	645	650	655
Ser	Asn	Leu	Gln	Lys	Ala	Val	Tyr	Lys	Gly	Glu	Leu	Thr	Asp	Asn	Asp	660	665	670
Val	Ala	Ile	Asp	Tyr	Leu	Met	Asn	Gln	Pro	His	Val	Met	Pro	Arg	Leu	675	680	685
Asn	Gln	Arg	Ile	Leu	Ser	Gln	Glu	Asp	Val	Lys	Tyr	Leu	Asp	Ile	Asn	690	695	700
Gly	Val	Ala	Tyr	Lys	Asn	Leu	Gly	Asn	Val	Gly	Val	Leu	Asn	Arg	Leu	705	710	715
Ser	Asn	Arg	Asp	Met	Thr	Ala	Thr	Leu	Met	Asp	Asn	Leu	Lys	Tyr	Phe	725	730	735
Gly	Gly	Lys	Lys	Ser	Thr	Glu	Leu	Ile	Gly	Arg	Thr	Ser	Leu	Gln	Phe	740	745	750
Leu	Thr	Ile	Trp	Val	Phe	Ala	Asp	Leu	Glu	Thr	Asp	Gln	Gly	Arg	Asp	755	760	765
Leu	Leu	Thr	His	Ala	Leu	Asp	Tyr	Val	Gln	Ser	Gly	Glu	Ser	Val	Arg	770	775	780
Val	Ala	Phe	Ile	Pro	Asn	Thr	Glu	Ser	Ser	Ser	Ala	Ser	Ser	Arg	Arg	785	790	795
Asn	Leu	Asn	Arg	Leu	Val	Trp	Ala	Ala	Met	Gln	Ser	Leu	Pro	Pro	Thr	805	810	815
Gln	Ala	Thr	Glu	Gln	Val	Leu	Lys	Trp	Leu	Lys	Lys	Pro	Lys	Glu	Lys	820	825	830
Ile	Glu	Ile	Pro	Thr	Gln	Leu	Glu	Asp	Ile	Leu	Gly	Ser	Thr	Glu	Leu	835	840	845
His	Leu	Lys	Met	Leu	Arg	Val	Tyr	Ser	Gln	Arg	Val	Leu	Gly	Leu	Asn	850	855	860
Lys	Ser	Gln	Arg	Leu	Val	Ile	Gly	Asn	Gly	Arg	Leu	Tyr	Gly	Pro	Leu	865	870	875
Ser	Ser	Asp	Glu	Ser	Phe	Asp	Ser	Ala	Asp	Phe	Ala	Leu	Leu	Ala	Arg	885	890	895
Phe	Ser	Ser	Leu	Gln	Tyr	Ser	Asp	Lys	Val	Arg	Gln	Val	Leu	Lys	Glu			

Gly Ala Pro Tyr Ala Tyr Thr Pro Phe Cys Asp Ser Arg Lys Glu Met
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 Glu Gly Phe Arg Phe Trp Lys Gln Gly Tyr Trp Arg Ser His Leu Met
 1380 1385 1390
 Gly Arg Arg Tyr His Ile Ser Ala Leu Tyr Val Val Asp Leu Lys Arg
 1395 1400 1405
 Phe Arg Lys Ile Ala Ala Gly Asp Arg Leu Arg Gly Gln Tyr Gln Ala
 1410 1415 1420
 Leu Ser Gln Asp Pro Asn Ser Leu Ser Asn Leu Asp Gln Asp Leu Pro
 1425 1430 1435 1440
 Asn Asn Met Ile His Gln Val Ala Ile Lys Ser Leu Pro Asp Asp Trp
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 Leu Trp Cys Gln Thr Trp Cys Ser Asp Ser Asn Phe Lys Thr Ala Lys
 1460 1465 1470
 Val Ile Asp Leu Cys Asn Asn Pro Gln Thr Lys Glu Ala Lys Leu Thr
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 Ala Ala Gln Arg Ile Val Pro Glu Trp Lys Asp Tyr Asp Ala Glu Leu
 1490 1495 1500
 Lys Thr Leu Met Ser Arg Ile Glu Asp His Glu Asn Ser His Ser Arg
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 Asp Ser Ala Val Asp Asp Ser Val Asp Asp Ser Val Glu Val Thr Thr
 1525 1530 1535
 Val Thr Pro Ser His Glu Pro Lys His Gly Glu Leu
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 35 40 45
 Glu Gly Phe Ile Trp Tyr Leu Asn His Leu Ser Asp Leu Leu Asp Ala
 50 55 60
 Glu Asn Thr Thr Glu Lys Glu Leu Tyr Ile Asn Val Val Asn Ser Leu
 65 70 75 80
 Lys Arg Glu Tyr Val Leu Ser Asp Glu Glu Leu Ser Ser Leu Gln Phe
 85 90 95
 Ser Leu Gly Leu Phe Ser Gly Ala Pro Lys Leu Gln Ala Phe Ser Ser
 100 105 110
 Ile Val Gln Ser Arg Thr Cys Asp Cys Asp Thr Trp Leu Gln Leu Asp
 115 120 125
 Glu Glu Ser Gln Val Cys Phe Ser Asp Leu Pro Lys Asp Ser Pro Leu
 130 135 140
 Phe Ser Lys Leu Tyr Ser Lys Asn Pro Leu Asp Tyr Glu Val Val Lys
 145 150 155 160
 Thr Ser Ala Thr Gly Ile Pro Tyr Ala Val Val Val Thr Ser Phe Glu
 165 170 175

Arg	Asp	Leu	Ile	Pro	Phe	His	Glu	Leu	Tyr	Tyr	Lys	Leu	Ala	Leu	Glu		
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Gly	Lys	Cys	Asn	Tyr	Val	Ile	Arg	Tyr	Ser	Pro	Pro	Ser	Ser	Ser	Lys		
		195					200					205					
Leu	Asn	Ser	Lys	Leu	Tyr	Val	Lys	Gly	Phe	Gly	Thr	His	Val	Ser	Leu		
	210					215					220						
Lys	Arg	Thr	Asp	Tyr	Leu	Val	Val	Asp	Asp	Arg	Glu	Phe	Pro	Arg	Glu		
225					230					235					240		
Lys	Gly	Asp	Asn	Pro	Ala	Ser	Phe	Thr	Ser	Ser	Arg	Asn	Lys	Arg	Ser		
			245						250					255			
Asn	Glu	Arg	Leu	Phe	Gly	Met	Thr	Ser	Asp	Ser	Leu	Gln	Thr	Val	Thr		
		260						265					270				
Pro	Asp	Lys	Ile	Ala	Ile	Leu	Asp	Leu	Leu	Ala	Thr	Gln	Ser	Ile	Ala		
	275						280					285					
Ser	Ser	Ala	Asp	Met	Leu	Ser	Ala	Phe	Arg	Glu	Leu	Thr	Gln	Asp	Phe		
	290					295					300						
Pro	Ile	Tyr	Ala	His	Tyr	Leu	Ser	Ile	Gln	Pro	Asp	Val	Ser	Asn	His		
305					310					315					320		
Leu	Ile	Glu	Glu	Leu	Asn	Gln	Phe	Gln	Ser	Gln	Tyr	Val	Pro	Glu	Gly		
			325						330					335			
Ile	Asn	Thr	Ile	Trp	Leu	Asn	Gly	Leu	Ser	Leu	Asp	Leu	Glu	Glu	Thr		
		340						345					350				
Asp	Ala	Phe	Ser	Ile	Leu	Ser	Leu	Ile	Lys	Lys	Glu	Lys	Asp	Met	Phe		
	355						360					365					
Asp	Arg	Phe	Glu	Ala	Leu	Gly	Ile	Lys	Ser	Ser	Lys	Val	Leu	Asp	Ile		
	370					375					380						
Val	Thr	Asn	Glu	Ala	Phe	Ala	Asn	Glu	Asp	Ser	Asp	Phe	Lys	Phe	Val		
385					390					395					400		
Lys	Phe	His	Cys	Gln	Asp	Asp	Ile	Glu	Asp	Trp	Lys	Ala	Ile	His	Trp		
			405						410					415			
Val	Asn	Glu	Ile	Glu	Ser	Asn	Pro	Lys	Tyr	Asp	Asn	Trp	Pro	Lys	Ser		
		420						425					430				
Ile	Gln	Ile	Leu	Leu	Lys	Pro	Ile	Tyr	Pro	Gly	Gln	Leu	His	Met	Leu		
	435						440					445					
Gly	Lys	Gln	Leu	His	Thr	Val	Ile	Tyr	Pro	Ile	Phe	Pro	Ser	Ser	Pro		
	450					455					460						
Ser	Ser	Leu	Pro	Leu	Leu	Ser	Glu	Leu	Ile	Gln	Phe	Ser	Arg	Arg	Pro		
465					470					475					480		
Ser	Pro	Val	Gln	Thr	Gly	Met	Val	Cys	Ala	Ala	Asn	Asp	Asp	Asp	Glu		
			485						490					495			
Phe	Ala	Gln	Thr	Val	Cys	Lys	Ser	Phe	Phe	Tyr	Ile	Ser	Lys	Glu	Ser		
		500						505					510				
Gly	Thr	Asp	Ser	Ala	Leu	Lys	Phe	Leu	Tyr	Lys	Cys	Leu	Asn	Ser	Asp		
	515						520					525					
Ser	Ser	Ala	Asp	Leu	Tyr	Ser	Leu	Leu	Glu	Glu	His	Leu	Pro	Leu	Ser		
	530					535					540						
Glu	His	Asp	Asp	Asp	Thr	Leu	Ala	Asn	Leu	Lys	Lys	Asp	Leu	Ser	Ser		
545					550					555					560		
Ser	Phe	Phe	Asp	His	Tyr	Met	Ser	Lys	Ser	Asn	Ser	Trp	Val	Asn	Arg		
			565						570					575			
Leu	Gly	Ile	Asp	Ser	Ser	Ala	Ser	Glu	Val	Ile	Val	Asn	Gly	Arg	Ile		
		580						585					590				
Ile	Ser	His	Asp	Glu	Asn	Tyr	Asp	Arg	Ser	Met	Tyr	Gly	Ile	Phe	Leu		
		595					600					605					
Glu	Asp	Ile	Pro	Glu	Val	Gln	Ile	Ala	Val	Ala	Glu	Gly	Lys	Ile	Ser		
	610					615					620						
Glu	Asp	Asp	Asn	Leu	Leu	Asp	Phe	Ile	Leu	Arg	Asp	Ala	Ser	Leu	Thr		

625					630					635				640
Arg	Asn	Pro	Leu	Val	Tyr	Pro	Ser	Ala	Lys	Ser	Ser	Ile	Lys	Ser
				645					650				655	
Asp	Ile	Lys	Arg	Val	Leu	Glu	Asn	Val	Gly	Ser	Leu	Asn	His	Glu
			660					665				670		
Ile	Leu	Leu	Ile	Gly	Ser	Ser	Asn	Ala	Lys	Tyr	Ser	Phe	Trp	Leu
		675					680				685			
Ala	Asp	Phe	Asn	Glu	Lys	Glu	Gly	Leu	Glu	Ile	Leu	Ser	Leu	Ala
	690					695					700			
Asp	Leu	Leu	Ser	Glu	Asn	Lys	Asp	Ala	Asn	Leu	Met	Leu	Ile	Gln
705					710					715				720
Gly	Lys	Asn	His	Val	Val	Pro	Pro	Leu	Phe	Ala	Lys	Leu	Leu	Ser
			725						730					735
Pro	Lys	Arg	Ser	Ser	Lys	His	Leu	Gln	Glu	Ile	Leu	Asn	Ser	Leu
		740					745						750	
Asp	Pro	Ser	Ser	Gly	Val	Val	Asn	Asp	Met	Asp	Lys	Ala	Leu	Lys
	755						760					765		
Leu	Lys	Lys	Ser	Lys	Ala	Val	Val	Lys	Glu	Leu	Gly	Leu	Thr	Gly
	770					775					780			
Cys	Lys	Ser	Ala	Leu	Leu	Leu	Asn	Gly	Arg	Met	Ile	Cys	Ser	Phe
785					790					795				800
Val	Asp	Ser	Leu	Asn	Thr	Ala	Asp	Leu	Lys	Met	Leu	Met	Gln	Met
				805					810					815
Tyr	Asp	Asn	Tyr	Leu	Ser	Lys	Leu	Ser	Asn	Ile	Ala	Gly	Ser	Ser
		820					825						830	
Arg	Leu	Lys	Asn	Ser	Arg	Ala	Ile	Ser	Phe	Leu	Ser	Ser	Tyr	Leu
		835				840						845		
Thr	Leu	Glu	Ser	Thr	Pro	Met	Ser	Thr	Ser	Ser	Pro	Thr	Lys	Glu
	850				855						860			
Lys	Leu	Phe	Pro	Arg	Asp	Phe	Ile	Tyr	Asn	Lys	Leu	Gly	Val	Gly
865				870						875				880
Ala	Thr	Phe	Glu	Thr	Asp	Asp	Phe	Ser	Lys	Ala	Tyr	Tyr	Gln	Phe
			885						890					895
Ala	Val	Leu	Asp	Pro	Leu	Ser	Lys	Asp	Ser	Gln	Lys	Trp	Ser	Ala
		900					905						910	
Leu	Glu	Ala	Val	Ser	Lys	Leu	Asn	Gly	Val	Gly	Val	Arg	Ile	His
	915						920					925		
Asn	Pro	Lys	Gln	Thr	Leu	Ser	Glu	Leu	Pro	Leu	Thr	Arg	Phe	Tyr
	930				935					940				
Tyr	Ser	Ile	Ser	Ala	Glu	Pro	Glu	Phe	Asp	Ala	Leu	Gly	His	Leu
945				950					955					960
Glu	Ser	Tyr	Val	Glu	Phe	Asp	Asn	Leu	Pro	Ala	Asp	Thr	Leu	Leu
			965					970						975
Met	Asp	Ile	Glu	Ala	Arg	Asp	Ala	Trp	Thr	Val	Met	Gln	Lys	Asp
		980					985						990	
Asp	Ile	Asp	Leu	Phe	Asn	Ile	Lys	Leu	Glu	His	Thr	Ser	Glu	Ala
	995					1000						1005		
Ala	Leu	Asp	Ser	His	Thr	Ala	Ile	Tyr	Glu	Leu	Lys	Asn	Ile	Leu
	1010				1015						1020			
Gln	Gly	Tyr	Ser	Gln	Glu	Glu	Phe	Arg	Lys	Ser	Pro	Pro	Arg	Gly
1025				1030					1035					1040
Gln	Leu	Lys	Leu	Gly	Asn	Leu	Thr	Asn	Ser	His	Val	Thr	Asp	Thr
			1045					1050						1055
Val	Leu	Ser	Asn	Leu	Gly	Tyr	Phe	Gln	Leu	Lys	Ala	Asn	Pro	Gly
		1060					1065					1070		
Trp	Thr	Leu	Glu	Pro	Met	Asp	Gly	Arg	Ser	Ser	Gln	Phe	Tyr	Glu
		1075					1080					1085		

Leu Ser Leu Asn Lys Lys Asn Ser Tyr Lys Asp Pro Gln Val Ile Val
 1090 1095 1100
 Asp Ser Phe Glu Gly Val Thr Leu Asn Pro Val Met Arg Arg Lys Pro
 1105 1110 1115 1120
 Gly Phe Glu Ser Ala Asp Ile Met Asp Glu Asp Leu Ser Ser His Lys
 1125 1130 1135
 Phe Phe Asp Lys Ile Lys Lys Ser Leu Ser Phe Phe Asn Phe Lys Arg
 1140 1145 1150
 Lys Glu Ala Ser Ile Asn Ile Phe Ser Val Ala Ser Gly His Leu Tyr
 1155 1160 1165
 Glu Arg Phe Leu Tyr Ile Met Thr Lys Ser Val Ile Glu His Thr Asp
 1170 1175 1180
 Lys Lys Val Lys Phe Trp Phe Ile Glu Asn Phe Leu Ser Pro Cys Phe
 1185 1190 1195 1200
 Lys Ser Ser Ile Pro Ala Ile Ala Lys Lys Tyr Asn Phe Glu Tyr Glu
 1205 1210 1215
 Tyr Ile Thr Tyr Asn Trp Pro His Trp Leu Arg Lys Gln Glu Glu Lys
 1220 1225 1230
 Gln Arg Glu Ile Trp Gly Tyr Lys Ile Leu Phe Leu Asp Val Leu Phe
 1235 1240 1245
 Pro Leu Glu Leu His Lys Val Ile Tyr Val Asp Ala Gln Ile Val Arg
 1250 1255 1260
 Ala Asp Leu Gln Glu Leu Met Asp Met Asp Leu His Gly Ala Pro Tyr
 1265 1270 1275 1280
 Gly Tyr Thr Pro Met Cys Asp Ser Arg Glu Glu Met Glu Gly Phe Arg
 1285 1290 1295
 Phe Trp Lys Lys Gly Tyr Trp Lys Lys Phe Leu Arg Gly Leu Lys Tyr
 1300 1305 1310
 His Ile Ser Ala Leu Tyr Val Val Asp Leu Asp Arg Phe Arg Lys Met
 1315 1320 1325
 Gly Ala Gly Asp Leu Leu Arg Arg Gln Tyr Gln Leu Leu Ser Ala Asp
 1330 1335 1340
 Pro Asn Ser Leu Ser Asn Leu Asp Gln Asp Leu Pro Asn His Leu Gln
 1345 1350 1355 1360
 His Leu Ile Pro Ile Tyr Ser Leu Pro Gln Asp Trp Leu Trp Cys Glu
 1365 1370 1375
 Thr Trp Cys Ser Asp Glu Ser Leu Lys Thr Ala Lys Thr Ile Asp Leu
 1380 1385 1390
 Cys Gln Asn Pro Leu Thr Lys Glu Lys Lys Leu Asp Arg Ala Arg Arg
 1395 1400 1405
 Gln Val Ser Glu Trp Thr Ser Tyr Asp Asn Glu Ile Ala Ser Val Leu
 1410 1415 1420
 Gln Thr Ala Ser Ser Gln Ser Asp Lys Glu Phe Glu Glu Lys Asp Asn
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 Asn Ser Ser Pro Asp Glu Leu
 1445

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 <212> PRT
 <213> *S. cerevisiae*

 <220>
 <223> *S. cerevisiae* Alr1p

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Ser	Asn	Ser	Leu	Ala	Asn	Thr	Met	Val	Ser	Met	Lys	Thr	Glu	Asp	His
			20					25					30		
Thr	Gly	Leu	Tyr	Asp	His	Arg	Gln	His	Pro	Asp	Ser	Leu	Pro	Val	Arg
		35					40					45			
His	Gln	Pro	Pro	Thr	Leu	Lys	Asn	Lys	Glu	Ile	Ala	Lys	Ser	Thr	Lys
		50				55					60				
Pro	Ser	Ile	Pro	Lys	Glu	Gln	Lys	Ser	Ala	Thr	Arg	Tyr	Asn	Ser	His
65					70					75					80
Val	Asp	Val	Gly	Ser	Val	Pro	Ser	Arg	Gly	Arg	Met	Asp	Phe	Glu	Asp
			85						90					95	
Glu	Gly	Gln	Gly	Met	Asp	Glu	Thr	Val	Ala	His	His	Gln	Leu	Arg	Ala
			100					105					110		
Ser	Ala	Ile	Leu	Thr	Ser	Asn	Ala	Arg	Pro	Ser	Arg	Leu	Ala	His	Ser
		115					120					125			
Met	Pro	His	Gln	Arg	Gln	Leu	Tyr	Val	Glu	Ser	Asn	Ile	His	Thr	Pro
		130				135					140				
Pro	Lys	Asp	Val	Gly	Val	Lys	Arg	Asp	Tyr	Thr	Met	Ser	Ser	Ser	Thr
145					150					155					160
Ala	Ser	Ser	Gly	Asn	Lys	Ser	Lys	Leu	Ser	Ala	Ser	Ser	Ser	Ala	Ser
				165					170					175	
Pro	Ile	Thr	Lys	Val	Arg	Lys	Ser	Ser	Leu	Val	Ser	Pro	Val	Leu	Glu
			180					185					190		
Ile	Pro	His	Glu	Ser	Lys	Ser	Asp	Thr	His	Ser	Lys	Leu	Ala	Lys	Pro
		195					200					205			
Lys	Lys	Arg	Thr	Tyr	Ser	Thr	Thr	Ser	Ala	His	Ser	Ser	Ile	Asn	Pro
		210				215					220				
Ala	Val	Leu	Leu	Thr	Lys	Ser	Thr	Ser	Gln	Lys	Ser	Asp	Ala	Asp	Asp
225					230					235					240
Asp	Thr	Leu	Glu	Arg	Lys	Pro	Val	Arg	Met	Asn	Thr	Arg	Ala	Ser	Phe
				245					250					255	
Asp	Ala	Asp	Val	Ser	Gln	Ala	Ser	Arg	Asp	Ser	Gln	Glu	Thr	Glu	Glu
			260					265					270		
Asp	Val	Cys	Phe	Pro	Met	Pro	Pro	Gln	Leu	His	Thr	Arg	Val	Asn	Gly
		275					280					285			
Ile	Asp	Phe	Asp	Glu	Leu	Glu	Glu	Tyr	Ala	Gln	Phe	Ala	Asn	Ala	Glu
		290				295					300				
Lys	Ser	Gln	Phe	Leu	Ala	Ser	Leu	Gln	Val	Pro	Asn	Glu	Gln	Lys	Tyr
305					310					315					320
Ser	Asn	Val	Ser	Gln	Asp	Ile	Gly	Phe	Thr	Ser	Ser	Thr	Ser	Thr	Ser
				325					330					335	
Gly	Ser	Ser	Ala	Ala	Leu	Lys	Tyr	Thr	Pro	Arg	Val	Ser	Gln	Thr	Gly
			340					345					350		
Glu	Lys	Ser	Glu	Ser	Thr	Asn	Glu	Thr	Glu	Ile	His	Glu	Lys	Lys	Glu
		355					360					365			
Asp	Glu	His	Glu	Lys	Ile	Lys	Pro	Ser	Leu	His	Pro	Gly	Ile	Ser	Phe
		370				375					380				
Gly	Lys	Asn	Lys	Val	Glu	Gly	Glu	Glu	Asn	Glu	Asn	Ile	Pro	Ser	Asn
385					390					395					400
Asp	Pro	Ala	Tyr	Cys	Ser	Tyr	Gln	Gly	Thr	Asp	Phe	Gln	Ile	Pro	Asn
				405					410					415	
Arg	Phe	Ser	Phe	Phe	Cys	Ser	Glu	Ser	Asp	Glu	Thr	Val	His	Ala	Ser
			420					425					430		
Asp	Ile	Pro	Ser	Leu	Val	Ser	Glu	Gly	Gln	Thr	Phe	Tyr	Glu	Leu	Phe
		435					440					445			
Arg	Gly	Gly	Glu	Pro	Thr	Trp	Trp	Leu	Asp	Cys	Ser	Cys	Pro	Thr	Asp

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<211> 858
<212> PRT
<213> S. cerevisiae
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<220>

<223> *S. cerevisiae* Alr2p

<400> 11

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Ser	Lys	Ser	Val	Asp	Asn	Thr	Ala	Ala	Ser	Met	Lys	Thr	Gly	Lys	Tyr
			20					25					30		
Pro	Lys	Leu	Glu	Asn	Tyr	Arg	Gln	Tyr	Ser	Asp	Ala	Gln	Pro	Ile	Arg
		35					40					45			
His	Glu	Ala	Leu	Ala	Leu	Lys	Val	Asp	Glu	Thr	Lys	Asp	Ser	Arg	His
	50					55					60				
Lys	Phe	Ser	Ser	Ser	Asn	Gly	Glu	Asn	Ser	Gly	Val	Glu	Asn	Gly	Gly
65					70					75					80
Tyr	Val	Glu	Lys	Thr	Asn	Ile	Ser	Thr	Ser	Gly	Arg	Met	Asp	Phe	Glu
				85					90					95	
Gly	Glu	Ala	Glu	Ala	Glu	Ala	Val	Lys	Arg	Tyr	Gln	Leu	Arg	Ser	Phe
			100					105					110		
Ala	Leu	Leu	Ser	Ser	Asn	Ala	Arg	Pro	Ser	Arg	Leu	Ala	Lys	Ser	Glu
		115					120					125			
Thr	His	Gln	Lys	Gln	Ile	His	Val	Glu	Ser	Ile	Ala	Pro	Ser	Leu	Pro
	130					135					140				
Lys	Asn	Ala	Ala	Leu	Glu	Arg	Gly	His	Asp	Thr	Ala	Leu	Pro	Ala	Gly
145					150				155						160
Thr	Ser	Ser	Asn	Arg	Cys	Asn	Leu	Glu	Ala	Ser	Ser	Ser	Ala	Arg	Thr
				165					170					175	
Phe	Thr	Ser	Ala	Arg	Lys	Ala	Ser	Leu	Val	Ser	Ala	Ile	Phe	Glu	Thr
			180					185					190		
Ser	Ala	Glu	Ser	Glu	His	Gly	Thr	His	Pro	Lys	Gln	Ala	Lys	Leu	Lys
	195						200					205			
Arg	Arg	Thr	Tyr	Ser	Thr	Ile	Ser	Thr	His	Ser	Ser	Val	Asn	Pro	Thr
	210					215					220				
Thr	Leu	Leu	Thr	Arg	Thr	Ala	Ser	Gln	Lys	Ser	Asp	Met	Gly	Asn	Asp
225					230					235					240
Thr	Arg	Arg	Ile	Lys	Pro	Leu	Arg	Met	Asp	Ser	Arg	Val	Ser	Phe	His
				245					250					255	
Ser	Glu	Ile	Ser	Gln	Ala	Ser	Arg	Asp	Ser	Gln	Glu	Thr	Glu	Glu	Asp
		260						265					270		
Val	Cys	Phe	Pro	Met	Phe	Arg	Leu	Leu	His	Thr	Arg	Val	Asn	Gly	Val
	275						280					285			
Asp	Phe	Asp	Glu	Leu	Glu	Glu	Tyr	Ala	Gln	Ile	Ser	Asn	Ala	Glu	Arg
	290					295					300				
Asn	Leu	Ser	Leu	Ala	Asn	His	Gln	Arg	His	Ser	Glu	Arg	Thr	Tyr	Asn
305					310					315					320
His	Thr	Asp	Gln	Asp	Thr	Gly	Phe	Thr	Asn	Ser	Ala	Ser	Thr	Ser	Gly
				325					330					335	
Ser	Ser	Ala	Ala	Leu	Lys	Tyr	Thr	Pro	Glu	Ile	Ser	Arg	Thr	Leu	Glu
			340					345					350		
Lys	Asn	Cys	Ser	Val	Asn	Glu	Met	Tyr	Val	Ser	Glu	Asn	Asn	Glu	Ser
		355					360					365			
Val	Arg	Glu	Asp	Asp	Lys	Pro	Asp	Leu	His	Pro	Asp	Val	Thr	Phe	Gly
	370					375					380				
Arg	Asn	Lys	Ile	Glu	Gly	Glu	Lys	Glu	Gly	Asn	Asp	Ser	Ser	Tyr	Ser
385					390					395					400
Arg	Ala	Tyr	Tyr	Thr	Leu	Gln	Asn	Thr	Glu	Tyr	Gln	Ile	Pro	Ser	Arg
				405					410					415	

Phe	Ser	Phe	Phe	Arg	Ser	Glu	Ser	Asp	Glu	Thr	Val	His	Ala	Ser	Asp	420	425	430
Ile	Pro	Ser	Leu	Ile	Ser	Glu	Gly	Gln	Thr	Phe	Tyr	Glu	Leu	Phe	Lys	435	440	445
Gly	Gly	Asp	Pro	Thr	Trp	Trp	Leu	Asp	Cys	Ser	Cys	Pro	Thr	Asp	Asp	450	455	460
Glu	Met	Arg	Cys	Ile	Ala	Lys	Thr	Phe	Gly	Ile	His	Pro	Leu	Thr	Ala	465	470	475
Glu	Asp	Ile	Arg	Met	Gln	Glu	Thr	Arg	Glu	Lys	Val	Glu	Leu	Phe	Lys	485	490	495
Ser	Tyr	Tyr	Phe	Val	Cys	Phe	His	Thr	Phe	Glu	Asn	Asp	Lys	Glu	Ser	500	505	510
Glu	Asn	Tyr	Leu	Glu	Pro	Ile	Asn	Val	Tyr	Ile	Val	Val	Phe	Arg	Ser	515	520	525
Gly	Val	Leu	Thr	Phe	His	Phe	Asp	Pro	Ile	Ser	His	Cys	Ala	Asn	Val	530	535	540
Arg	Arg	Arg	Val	Arg	Gln	Leu	Arg	Asp	Tyr	Val	Ser	Val	Asn	Ser	Asp	545	550	555
Trp	Leu	Cys	Tyr	Ala	Leu	Ile	Asp	Asp	Ile	Thr	Asp	Ser	Phe	Ala	Pro	565	570	575
Val	Ile	Gln	Ser	Ile	Glu	Tyr	Glu	Ala	Asp	Ser	Ile	Asp	Asp	Ser	Val	580	585	590
Phe	Met	Thr	Arg	Asp	Met	Asp	Phe	Ala	Ala	Met	Leu	Gln	Arg	Ile	Gly	595	600	605
Glu	Ser	Arg	Arg	Lys	Thr	Met	Thr	Leu	Met	Arg	Leu	Leu	Ser	Gly	Lys	610	615	620
Ala	Asp	Val	Ile	Lys	Met	Phe	Ala	Lys	Arg	Cys	Gln	Asp	Glu	Thr	Asn	625	630	635
Gly	Ile	Gly	Pro	Val	Leu	Lys	Ser	Gln	Thr	Asn	Met	Val	Asn	Leu	Gln	645	650	655
Ala	Glu	Gln	Glu	Asn	Val	Asn	Gln	Asn	Asn	Ser	Asn	Asn	Gln	Ile	Ser	660	665	670
Leu	Ser	Asn	Ser	Tyr	Met	Gln	Thr	Ser	Gln	Pro	Arg	Gly	Asp	Ile		675	680	685
Ala	Leu	Tyr	Leu	Gly	Asp	Ile	Gln	Asp	His	Leu	Leu	Thr	Met	Phe	Gln	690	695	700
Asn	Leu	Leu	Ala	Tyr	Glu	Lys	Ile	Phe	Ser	Arg	Ser	His	Ala	Asn	Tyr	705	710	715
Leu	Ala	Gln	Leu	Gln	Val	Glu	Ser	Phe	Asn	Ser	Asn	Asn	Lys	Val	Thr	725	730	735
Glu	Met	Leu	Gly	Lys	Val	Thr	Met	Leu	Gly	Thr	Met	Leu	Val	Pro	Leu	740	745	750
Asn	Val	Ile	Thr	Gly	Leu	Phe	Gly	Met	Asn	Val	Lys	Val	Pro	Gly	Arg	755	760	765
Asn	Gly	Ser	Ile	Ala	Trp	Trp	Tyr	Gly	Ile	Leu	Gly	Val	Leu	Leu	Leu	770	775	780
Leu	Ala	Val	Ile	Ser	Trp	Phe	Leu	Ala	Ser	Tyr	Trp	Ile	Lys	Lys	Ile	785	790	795
Asp	Pro	Pro	Ala	Thr	Leu	Asn	Glu	Ala	Ala	Gly	Ser	Gly	Ala	Lys	Ser	805	810	815
Val	Ile	Ser	Ser	Phe	Leu	Pro	Lys	Arg	Asp	Lys	Arg	Phe	Asn	Asp	Asp	820	825	830
Ser	Lys	Asn	Gly	Asn	Ala	Arg	Val	Gly	Val	Arg	Arg	Lys	Ser	Thr	Val	835	840	845
Ser	Leu	Pro	Ser	Arg	Tyr	Ser	Arg	Tyr	Asn							850	855	

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 <213> *S. cerevisiae*

<220>
 <223> *S. cerevisiae* CDC24

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 Lys Pro Lys Pro Ser Ala Thr Ser Ile Ser Ile Pro Met Gln Asn Val
 20 25 30
 Met Asn Lys Pro Val Thr Glu Gln Asp Ser Leu Phe His Ile Cys Ala
 35 40 45
 Asn Ile Arg Lys Arg Leu Glu Val Leu Pro Gln Leu Lys Pro Phe Leu
 50 55 60
 Gln Leu Ala Tyr Gln Ser Ser Glu Val Leu Ser Glu Arg Gln Ser Leu
 65 70 75 80
 Leu Leu Ser Gln Lys Gln His Gln Glu Leu Leu Lys Ser Asn Gly Ala
 85 90 95
 Asn Arg Asp Ser Ser Asp Leu Ala Pro Thr Leu Arg Ser Ser Ser Ile
 100 105 110
 Ser Thr Ala Thr Ser Leu Met Ser Met Glu Gly Ile Ser Tyr Thr Asn
 115 120 125
 Ser Asn Pro Ser Ala Thr Pro Asn Met Glu Asp Thr Leu Leu Thr Phe
 130 135 140
 Ser Met Gly Ile Leu Pro Ile Thr Met Asp Cys Asp Pro Val Thr Gln
 145 150 155 160
 Leu Ser Gln Leu Phe Gln Gln Gly Ala Pro Leu Cys Ile Leu Phe Asn
 165 170 175
 Ser Val Lys Pro Gln Phe Lys Leu Pro Val Ile Ala Ser Asp Asp Leu
 180 185 190
 Lys Val Cys Lys Lys Ser Ile Tyr Asp Phe Ile Leu Gly Cys Lys Lys
 195 200 205
 His Phe Ala Phe Asn Asp Glu Glu Leu Phe Thr Ile Ser Asp Val Phe
 210 215 220
 Ala Asn Ser Thr Ser Gln Leu Val Lys Val Leu Glu Val Val Glu Thr
 225 230 235 240
 Leu Met Asn Ser Ser Pro Thr Ile Phe Pro Ser Lys Ser Lys Thr Gln
 245 250 255
 Gln Ile Met Asn Ala Glu Asn Gln His Arg His Gln Pro Gln Gln Ser
 260 265 270
 Ser Lys Lys His Asn Glu Tyr Val Lys Ile Ile Lys Glu Phe Val Ala
 275 280 285
 Thr Glu Arg Lys Tyr Val His Asp Leu Glu Ile Leu Asp Lys Tyr Arg
 290 295 300
 Gln Gln Leu Leu Asp Ser Asn Leu Ile Thr Ser Glu Glu Leu Tyr Met
 305 310 315 320
 Leu Phe Pro Asn Leu Gly Asp Ala Ile Asp Phe Gln Arg Arg Phe Leu
 325 330 335
 Ile Ser Leu Glu Ile Asn Ala Leu Val Glu Pro Ser Lys Gln Arg Ile
 340 345 350
 Gly Ala Leu Phe Met His Ser Lys His Phe Phe Lys Leu Tyr Glu Pro
 355 360 365

Trp	Ser	Ile	Gly	Gln	Asn	Ala	Ala	Ile	Glu	Phe	Leu	Ser	Ser	Thr	Leu	370	375	380
His	Lys	Met	Arg	Val	Asp	Glu	Ser	Gln	Arg	Phe	Ile	Ile	Asn	Asn	Lys	385	390	395
Leu	Glu	Leu	Gln	Ser	Phe	Leu	Tyr	Lys	Pro	Val	Gln	Arg	Leu	Cys	Arg	405	410	415
Tyr	Pro	Leu	Leu	Val	Lys	Glu	Leu	Leu	Ala	Glu	Ser	Ser	Asp	Asp	Asn	420	425	430
Asn	Thr	Lys	Glu	Leu	Glu	Ala	Ala	Leu	Asp	Ile	Ser	Lys	Asn	Ile	Ala	435	440	445
Arg	Ser	Ile	Asn	Glu	Asn	Gln	Arg	Arg	Thr	Glu	Asn	His	Gln	Val	Val	450	455	460
Lys	Lys	Leu	Tyr	Gly	Arg	Val	Val	Asn	Trp	Lys	Gly	Tyr	Arg	Ile	Ser	465	470	475
Lys	Phe	Gly	Glu	Leu	Tyr	Phe	Asp	Lys	Val	Phe	Ile	Ser	Thr	Thr		485	490	495
Asn	Ser	Ser	Ser	Glu	Pro	Glu	Arg	Glu	Phe	Glu	Val	Tyr	Leu	Phe	Glu	500	505	510
Lys	Ile	Ile	Ile	Leu	Phe	Ser	Glu	Val	Val	Thr	Lys	Lys	Ser	Ala	Ser	515	520	525
Ser	Leu	Ile	Leu	Lys	Lys	Lys	Ser	Ser	Thr	Ser	Ala	Ser	Ile	Ser	Ala	530	535	540
Ser	Asn	Ile	Thr	Asp	Asn	Asn	Gly	Ser	Pro	His	His	Ser	Tyr	His	Lys	545	550	555
Arg	His	Ser	Asn	Ser	Ser	Ser	Ser	Asn	Asn	Ile	His	Leu	Ser	Ser	Ser	565	570	575
Ser	Ala	Ala	Ala	Ile	Ile	His	Ser	Ser	Thr	Asn	Ser	Ser	Asp	Asn	Asn	580	585	590
Ser	Asn	Asn	Ser	Ser	Ser	Ser	Ser	Leu	Phe	Lys	Leu	Ser	Ala	Asn	Glu	595	600	605
Pro	Lys	Leu	Asp	Leu	Arg	Gly	Arg	Ile	Met	Ile	Met	Asn	Leu	Asn	Gln	610	615	620
Ile	Ile	Pro	Gln	Asn	Asn	Arg	Ser	Leu	Asn	Ile	Thr	Trp	Glu	Ser	Ile	625	630	635
Lys	Glu	Gln	Gly	Asn	Phe	Leu	Leu	Lys	Phe	Lys	Asn	Glu	Glu	Thr	Arg	645	650	655
Asp	Asn	Trp	Ser	Ser	Cys	Leu	Gln	Gln	Leu	Ile	His	Asp	Leu	Lys	Asn	660	665	670
Glu	Gln	Phe	Lys	Ala	Arg	His	His	Ser	Ser	Thr	Ser	Thr	Thr	Ser	Ser	675	680	685
Thr	Ala	Lys	Ser	Ser	Ser	Met	Met	Ser	Pro	Thr	Thr	Thr	Met	Asn	Thr	690	695	700
Pro	Asn	His	His	Asn	Ser	Arg	Gln	Thr	His	Asp	Ser	Met	Ala	Ser	Phe	705	710	715
Ser	Ser	Ser	His	Met	Lys	Arg	Val	Ser	Asp	Val	Leu	Pro	Lys	Arg	Arg	725	730	735
Thr	Thr	Ser	Ser	Ser	Phe	Glu	Ser	Glu	Ile	Lys	Ser	Ile	Ser	Glu	Asn	740	745	750
Phe	Lys	Asn	Ser	Ile	Pro	Glu	Ser	Ser	Ile	Leu	Phe	Arg	Ile	Ser	Tyr	755	760	765
Asn	Asn	Asn	Ser	Asn	Asn	Thr	Ser	Ser	Ser	Glu	Ile	Phe	Thr	Leu	Leu	770	775	780
Val	Glu	Lys	Val	Trp	Asn	Phe	Asp	Asp	Leu	Ile	Met	Ala	Ile	Asn	Ser	785	790	795
Lys	Ile	Ser	Asn	Thr	His	Asn	Asn	Asn	Ile	Ser	Pro	Ile	Thr	Lys	Ile	805	810	815
Lys	Tyr	Gln	Asp	Glu	Asp	Gly	Asp	Phe	Val	Val	Leu	Gly	Ser	Asp	Glu			

			820					825				830			
Asp	Trp	Asn	Val	Ala	Lys	Glu	Met	Leu	Ala	Glu	Asn	Asn	Glu	Lys	Phe
		835					840					845			
Leu	Asn	Ile	Arg	Leu	Tyr										
	850														

<210> 13
 <211> 834
 <212> PRT
 <213> S. pombe

<220>
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<400> 13

Met	Lys	Leu	Arg	Leu	Leu	Gln	Ser	Pro	Ser	Gln	Val	Ile	Tyr	Asn	Leu
1				5					10					15	
Glu	Asn	Thr	Val	Ser	Leu	Tyr	Arg	Arg	Cys	Leu	Asn	Leu	Arg	Lys	Arg
			20					25					30		
Leu	Met	Asp	Ile	Ser	Glu	Leu	Ala	Ala	Phe	Phe	Asp	Ser	Ile	His	Arg
	35						40					45			
Glu	Ala	Leu	Asn	Ser	Ser	Phe	Lys	Ile	Leu	Glu	Phe	Lys	Asp	Ile	Glu
	50					55					60				
Phe	Asp	Asp	Pro	Val	Thr	Glu	Ile	Trp	Leu	Phe	Cys	Arg	Leu	Gly	Tyr
65					70					75				80	
Pro	Leu	Cys	Ala	Leu	Phe	Asn	Cys	Leu	Pro	Val	Lys	Gln	Lys	Leu	Glu
				85					90					95	
Val	Asn	Ser	Ser	Val	Ser	Leu	Glu	Asn	Thr	Asn	Val	Cys	Lys	Ala	Ser
			100					105					110		
Leu	Tyr	Arg	Phe	Met	Leu	Met	Cys	Lys	Asn	Glu	Leu	Gly	Leu	Thr	Asp
	115						120					125			
Ala	Ala	Leu	Phe	Ser	Ile	Ser	Glu	Ile	Tyr	Lys	Pro	Ser	Thr	Ala	Pro
	130					135					140				
Leu	Val	Arg	Ala	Leu	Gln	Thr	Ile	Glu	Leu	Leu	Leu	Lys	Lys	Tyr	Glu
145					150					155					160
Val	Ser	Asn	Thr	Thr	Lys	Ser	Ser	Ser	Thr	Pro	Ser	Pro	Ser	Thr	Asp
				165					170					175	
Asp	Asn	Val	Pro	Thr	Gly	Thr	Leu	Asn	Ser	Leu	Ile	Ala	Ser	Gly	Arg
			180					185					190		
Arg	Val	Thr	Ala	Glu	Leu	Tyr	Glu	Thr	Glu	Leu	Lys	Tyr	Ile	Gln	Asp
	195						200					205			
Leu	Glu	Tyr	Leu	Ser	Asn	Tyr	Met	Val	Ile	Leu	Gln	Gln	Lys	Gln	Ile
	210					215					220				
Leu	Ser	Gln	Asp	Thr	Ile	Leu	Ser	Ile	Phe	Thr	Asn	Leu	Asn	Glu	Ile
225					230					235					240
Leu	Asp	Phe	Gln	Arg	Arg	Phe	Leu	Val	Gly	Leu	Glu	Met	Asn	Leu	Ser
			245						250					255	
Leu	Pro	Val	Glu	Gln	Arg	Leu	Gly	Ala	Leu	Phe	Ile	Ala	Leu	Glu	
			260				265					270			
Glu	Gly	Phe	Ser	Val	Tyr	Gln	Val	Phe	Cys	Thr	Asn	Phe	Pro	Asn	Ala
	275						280					285			
Gln	Gln	Leu	Ile	Ile	Asp	Asn	Gln	Asn	Gln	Leu	Leu	Lys	Val	Ala	Asn
	290					295					300				
Leu	Leu	Glu	Pro	Ser	Tyr	Glu	Leu	Pro	Ala	Leu	Leu	Ile	Lys	Pro	Ile
305					310					315					320
Gln	Arg	Ile	Cys	Lys	Tyr	Pro	Leu	Leu	Leu	Asn	Gln	Leu	Leu	Lys	Gly

				325					330				335				
Thr	Pro	Ser	Gly	Tyr	Gln	Tyr	Glu	Glu	Glu	Leu	Lys	Gln	Gly	Met	Ala		
			340					345					350				
Cys	Val	Val	Arg	Val	Ala	Asn	Gln	Val	Asn	Glu	Thr	Arg	Arg	Ile	His		
		355					360					365					
Glu	Asn	Arg	Asn	Ala	Ile	Ile	Glu	Leu	Glu	Gln	Arg	Val	Ile	Asp	Trp		
	370					375				380							
Lys	Gly	Tyr	Ser	Leu	Gln	Tyr	Phe	Gly	Gln	Leu	Leu	Val	Trp	Asp	Val		
385				390				395						400			
Val	Asn	Val	Cys	Lys	Ala	Asp	Ile	Glu	Arg	Glu	Tyr	His	Val	Tyr	Leu		
			405					410					415				
Phe	Glu	Lys	Ile	Leu	Leu	Cys	Cys	Lys	Glu	Met	Ser	Thr	Leu	Lys	Arg		
		420						425					430				
Gln	Ala	Arg	Ser	Ile	Ser	Met	Asn	Lys	Lys	Thr	Lys	Arg	Leu	Asp	Ser		
	435					440						445					
Leu	Gln	Leu	Lys	Gly	Arg	Ile	Leu	Thr	Ser	Asn	Ile	Thr	Thr	Val	Val		
	450					455					460						
Pro	Asn	His	His	Met	Gly	Ser	Tyr	Ala	Ile	Gln	Ile	Phe	Trp	Arg	Gly		
465				470						475				480			
Asp	Pro	Gln	His	Glu	Ser	Phe	Ile	Leu	Lys	Leu	Arg	Asn	Glu	Glu	Ser		
			485					490					495				
His	Lys	Leu	Trp	Met	Ser	Val	Leu	Asn	Arg	Leu	Leu	Trp	Lys	Asn	Glu		
		500					505					510					
His	Gly	Ser	Pro	Lys	Asp	Ile	Arg	Ser	Ala	Ala	Ser	Thr	Pro	Ala	Asn		
	515					520					525						
Pro	Val	Tyr	Asn	Arg	Ser	Ser	Ser	Gln	Thr	Ser	Lys	Gly	Tyr	Asn	Ser		
	530				535						540						
Ser	Asp	Tyr	Asp	Leu	Leu	Arg	Thr	His	Ser	Leu	Asp	Glu	Asn	Val	Asn		
545				550						555				560			
Ser	Pro	Thr	Ser	Ile	Ser	Ser	Pro	Ser	Ser	Lys	Ser	Ser	Pro	Phe	Thr		
			565					570					575				
Lys	Thr	Thr	Ser	Lys	Asp	Thr	Lys	Ser	Ala	Thr	Thr	Thr	Asp	Glu	Arg		
		580					585					590					
Pro	Ser	Asp	Phe	Ile	Arg	Leu	Asn	Ser	Glu	Glu	Ser	Val	Gly	Thr	Ser		
	595					600					605						
Ser	Leu	Arg	Thr	Ser	Gln	Thr	Thr	Ser	Thr	Ile	Val	Ser	Asn	Asp	Ser		
	610				615					620							
Ser	Ser	Thr	Ala	Ser	Ile	Pro	Ser	Gln	Ile	Ser	Arg	Ile	Ser	Gln	Val		
625				630				635					640				
Asn	Ser	Leu	Leu	Asn	Asp	Tyr	Asn	Tyr	Asn	Arg	Gln	Ser	His	Ile	Thr		
			645				650					655					
Arg	Val	Tyr	Ser	Gly	Thr	Asp	Asp	Gly	Ser	Ser	Val	Ser	Ile	Phe	Glu		
		660					665				670						
Asp	Thr	Ser	Ser	Ser	Thr	Lys	Gln	Lys	Ile	Phe	Asp	Gln	Pro	Thr	Thr		
	675					680				685							
Asn	Asp	Cys	Asp	Val	Met	Arg	Pro	Arg	Gln	Tyr	Ser	Tyr	Ser	Ala	Gly		
	690				695					700							
Met	Lys	Ser	Asp	Gly	Ser	Leu	Leu	Pro	Ser	Thr	Lys	His	Thr	Ser	Leu		
705				710				715					720				
Ser	Ser	Ser	Ser	Thr	Ser	Thr	Ser	Leu	Ser	Val	Arg	Asn	Thr	Thr	Asn		
			725				730					735					
Val	Lys	Ile	Arg	Leu	Arg	Leu	His	Glu	Val	Ser	Leu	Val	Leu	Val	Val		
		740				745					750						
Ala	His	Asp	Ile	Thr	Phe	Asp	Glu	Leu	Leu	Ala	Lys	Val	Glu	His	Lys		
	755				760					765							
Ile	Lys	Leu	Cys	Gly	Ile	Leu	Lys	Gln	Ala	Val	Pro	Phe	Arg	Val	Arg		
	770				775					780							

Leu	Lys	Tyr	Val	Asp	Glu	Asp	Gly	Asp	Phe	Ile	Thr	Ile	Thr	Ser	Asp
785					790					795					800
Glu	Asp	Val	Leu	Met	Ala	Phe	Glu	Thr	Cys	Thr	Phe	Glu	Leu	Met	Asp
				805					810					815	
Pro	Val	His	Asn	Lys	Gly	Met	Asp	Thr	Val	Ser	Leu	His	Val	Val	Val
			820					825					830		
Tyr	Phe														